

THE OPTICAL MAGIC LANTERN — JOURNAL — AND PHOTOGRAPHIC ENLARGER.

EDITED BY J. HAY TAYLOR.

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Notices.

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NOTICE.

MANY CORRESPONDENTS STILL FORWARD THEIR COMMUNICATIONS TO THE OLD ADDRESS. WILL THEY PLEASE NOTE THAT OUR ADDRESS IS

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Notes.

THOUSANDS of lanternists are interested in the question of saturators for obtaining illumination for the lantern. As is evidenced by the demand, many look upon them with favour, whilst there are others who look upon them as being dangerous (possibly from heresay and because they have never tried them), so it has been arranged to devote the meeting of February 12th of the Lantern Society to the subject. The following question will be raised, "Are ether and other saturators a delusion and a snare, and should they be wiped off the face of the earth." Those who have anything to say *pro* or *con* are invited to the meeting, which will be one of an informal nature, and, for the most part, conversational. It is to be hoped that those who will not use saturators will give their reasons, and also that those who do will give their views. We intend to show in action the Lawson, Gridiron and Suiter saturators, and if anyone likes to bring up other forms they will find plenty of oxygen at hand. The meeting will be held at the headquarters of the Lantern Society, 20, Hanover Square, W., at eight o'clock punctually.

* * *

MR. AND MRS. SNOWDEN WARD, having severed their connection with the *Practical Photographer*, intend issuing a new monthly journal called the *Photogram*. It will be published on the 1st of each month at Memorial Hall, E.C., at three-pence.

On the 5th ult., Mr. Edgar G. Lee, the retiring Hon. Sec. of the Newcastle-on-Tyne Photographic Association, was the recipient of a purse of gold, silver inkstand and an album. Mr. Lee has made a special study of the making of lantern slides, a branch of photography in which it is said he stands second to no man. This Association, which was at first under the care of Mr. J. B. Payne, of the well-known firm of Messrs. Mawson & Swan, has now a membership of a hundred and sixty and has taken a prominent part in photographic activity.

Word has just reached us of the explosion of an oxygen cylinder (London make) which was being landed from a steamboat at Albany, N.Y., U.S.A. Several cylinders had been landed and thrown in a pile on the wharf, and as the last but one was being thrown down it burst, injuring four men to such an extent that they are not expected to recover. Our latest information states that one has since died.

In the course of some recent experiments it was found when making hydrogen gas by means of acid and zinc, that the rate of evolution of gas was greatly accelerated by the addition of a few drops of nitrate of cobalt to the acid and zinc. A thin film of cobalt is deposited on the zinc which acts with it as a voltaic couple.

MR. A. M. HIDDON, a well-known lanternist of Thames Place, Putney, has supplied us with the following questions, which he sends to those in authority at any hall at which he intends to give a lantern exhibition. He states that he has found this form of great convenience, and hopes others will also find it of use.

Name and full address of hall

Nearest Station and distance from Hall

Date of lecture Hour

Dimensions (estimated) of Hall

Length Breadth Height

Can you provide a suitable screen?

Size of screen used on former occasions?

Is house-gas laid on?

Probable distance of Lantern from the nearest gas jet?

Can the gas in the hall be lowered without affecting the particular jet from which the supply for the lantern is drawn?

If there is a gallery or balcony at the end of the hall, if so, state what distance the front of it is from the screen.

Will the hall be empty and at the operator's service for at least one hour previous to the lecture?

General remarks, various particulars, information etc.

Please fill in the above and return this form to

.....

.....

On the evening of December 14th, Commander C. E. Gladstone, R.N., Hon. Secretary of the Lantern Society, delivered at Trinity Church School-rooms, Islington, an illustrated lecture on the Architecture of Normandy. Slides of great beauty were exhibited, the lecture itself being a mine of instruction.

A FEW weeks ago, when making a small quantity of oxygen at a lecture on Chemistry at Berwick-on-Tweed Young Men's Temperance Association, using a copper retort and glass tubing, there was a slight explosion which put out the lights, some of the audience were slightly cut by flying glass, but happily no great damage was done.

A BRADFORD paper says the decision of the Railway Companies not to carry cylinders of compressed gas in passenger trains can only be characterized as idiotic.

MESSRS. ARTHUR SCHWARZ & Co., 9, New Broad Street, E.C., have been appointed sole wholesale agents for Dr. Heseikel's grain platina paper (grain surface). We expect by next month to submit this paper to trial.

MR. HENRY HAUSSMANN, for some time the London representative of Messrs. Arthur Schwarz & Co., has now terminated his connection with this firm. Mr. Hermann Schwarz, has been taken into partnership and in future the business of the London branch will be entirely under his supervision.

EARLY last month the premises of Messrs. Theobald, 43, Farringdon Road, were burned out, the stock at the time being estimated at £11,000, about one-third of which was covered by insurance. Fortunately a large stock of Christmas cards, toys, lanterns, etc., was stored at their Clerkenwell and Kensington warehouses. New premises were immediately taken at 19, Farringdon Street and stocked. As the books and current orders were saved, orders were able to be sent out almost as quickly as though nothing had happened, which shows excellent business management on the part of Messrs. Theobald.

A WRITER in Ayrshire states that "as lantern pictures have been found to attract so many people, the churches should adopt the lantern, there being nothing to be ashamed about." We have for over four years suggested this, and yet hope to see a lanternists' gallery fitted up in churches—it is only a question of time and is bound to come.

MR. BISHOP DOCKETT (slide artist), has, a few days ago, moved his studio from 48, Corrinne Road, Tufnell Park, N. to 65, Junction Road, N.

* * *

PROFESSOR GOODMAN, of the Yorkshire College, has issued his report on the recent fatal explosion of a gas cylinder at Bradford. He describes various examinations and tests which he made in the case, and these lead to the following conclusions:—(1) That the material of the Bradford cylinders (that of the accident and a similar one) is of a hard, brittle, and unyielding character, quite unsuitable for carrying high internal pressures, especially in its original state, before it has been annealed. The Professor makes the recommendation that oxygen cylinders should only be made of mild steel of the best quality, having a tensile strength of not over 32 tons per square inch, with an extension of not less than 20 per cent. on 10in., and that the carbon should not exceed 0.2 per cent., and the iron should not be less than 99 per cent.; that all cylinders should be thoroughly annealed, at a cherry-red heat, both when new and afterwards, at stated intervals; that the stress in the material should not exceed 6 tons per square inch; and that the high test pressures now adopted should be reduced. As far as Mr. Goodman is aware, there never has been a case of an accident through the bursting of a cylinder in a lecture room or in transit. The public, he adds, need not be in the slightest degree nervous about sitting near them while lantern lectures are being delivered.

—:o:—

A Convenient Cylinder Handle.

DIFFERENT people adopt different means of carrying gas cylinders. Some place a double strap around them and others a piece of stout cord, whilst others again carry them by means of a wing nut screwed on the valve.

As can readily be understood, we are in the habit of using a considerable quantity of oxygen in connection with trying various apparatus. These experiments we usually conduct at home, and necessitate carrying a ten-foot cylinder to town to be re-filled. For a long time we have been in the habit of carrying the cylinder by means of a winged nut screwed on the valve, but finding this sort of handle somewhat tiring on the fingers, we have now adopted a more comfortable sort of handle, which may be found to be of great convenience by those who may have occasion to carry a small cylinder.

The handle in question is formed not unlike the handle of a spade, and is screwed on to the end of the bottle. As a sketch will give a much



better idea of it than a long description, we give one, and will merely add that the metal portion is cast in gun metal, whereas the handle is of wood, covered with india rubber. We have found it of great advantage, and hope that others will find it of assistance when carrying a cylinder of such dimensions that when hanging from the hand it will be quite clear of the ground.

—:o:—

A Centigraphic Lantern.

A HUNDRED slides changed in the lantern by means of the lecturer from the opposite end of the hall is now a possibility, and, like many other good things, seems very simple when once one sees and handles the apparatus. For a week before Christmas we have had at our offices two different lanterns which enable this to be done. They are the invention of Mr. H. Simpson, of Liverpool, by whom patents have been applied for.

Without entering into minute particulars we will only at present give a general description of them, and will leave Messrs. Archer and Sons (Lord Street, Liverpool), to supply any further information that may be required by our readers.

The slides are contained in carriers which are hinged together on an endless band which passes over a spindle in exactly the same manner as the slides do in a revolving stereoscope. In the one lantern, the spindle which carries the band containing the slides is supported upon a species of carriage with four small wheels which run on rails which form the lower portion of the lantern between the condenser and the objective. The bottom of the lantern at this part is entirely open so as to permit of the endless band of slides hanging down, and, for this purpose, the lantern is supported upon a special form of stand between the four legs of which the band hangs to within a short distance of the floor. The actuating power is compressed air, which is worked by means of a simple form of pump clamped to the reading stand or the back of a chair within reach of the lecturer. Of course a rubber tube connects this to the lantern, to the lower side of which is a cylinder and piston. When the air is compressed by the lecturer by means of his pushing in the handle of the pump, the piston at the lantern is pushed towards the objective and carries with

it the carriage, from which is suspended the slides. This carriage, as soon as it moves forward, causes two translucent shutters to close in front of the lens to which it is connected with a rod. In passing forward, the next slide, which at this time is at right angles to the one being shown and which is situated in a position under the condenser, passes from beneath a spring, when a wheel on the moving carriage engages a pawl, which causes the spindle to be slightly rotated and the slide to be next shown is brought from a horizontal to a vertical position. During this change the slide is a few inches in front of the condenser, the carriage containing the spindle must be brought back again until the slide, now vertical is close to the condenser. This is effected by the lecturer pulling the handle of the pump beside his desk, which creates a vacuum in the cylinder on lantern, thus causing the piston to draw the carriage back, which in turn causes the shutters in front of lens to open, revealing another picture. To an observer near the lantern, none of the details are visible, and the only motions to be seen are the shutters in front of lens to close, the band of slides to move forward and back a few inches, and the shutters to open, thus causing the next picture to be seen, the change being made in two seconds. During the same movement, and whilst the lens is closed, the lime is slightly rotated.

In the other lantern spoken of, instead of the carriage containing the slide-band being moved, it is made stationary, and that portion containing the illuminant and condenser made to move backwards sufficient to allow of the horizontal pictures being brought to the vertical, after which it is again brought close to the slide. The lens-closing is done in a similar manner to that on the previous lantern.

With these two instruments a lecture and entertainment of two hundred dissolving views can be given by one individual stationed sixty or seventy feet from the lantern.

—:o:—

A Pair of Big Lanterns and a Big Loss.

DURING a chat over the editorial table with a facetious member of the old school, whose picturesque style is well-known to many of the present day, when talking about the improvements in lanterns which are springing up every day, he said: "Few people know that our firm made the largest pair of magic lanterns ever constructed. Well it was this way. Long, long

ago down in the forties, when the Adelaide Gallery and the Polytechnic Institution were striving for supremacy, and before the Panopticon in Leicester Square started its brief career, and even before photography came as a giant to aid the lantern, the best slide painters of the day found it impossible to paint sufficient details in a small compass, such as the size of the condensers necessitated the slides to be. To obviate this and also to keep its supremacy, the Polytechnic directors ordered a pair of monster lanterns, with 24 in. condensers, to be made by the then chief lantern makers of the day.

"By the way, there were rather a curious run of names on the staff of the Polytechnic in those days; there was *Knight, Day, Moon, and Stars*, whilst the chief directors were *Children* and many *Nurses*, ably assisted by *Cousins*. The managers rejoiced in the names of *Longbottom* and *Backhoffner*. In those good old days the place filled well and also paid well. Doubtless the shareholders in the last days (when they had a more *Spicey* manager) wished the old paying times were *Backhoffner*; I beg pardon, I mean back oftener.

"Well, as I was saying, we had to make large lanterns, and to make them large enough for a boy to go into to dust was easy enough, but the 24 in. condenser was quite a different matter. In those days we had the window tax and a heavy duty on glass, and, besides, the difficulties were far greater than now. However (our) the maker's motto being 'Excelsior,' we did the best according to our lights, though they may have been *Darker* than the present, for fifty years makes a good difference.

"We had a great time of it with building furnaces, casting lenses, rigging up machinery to grind, polish, and edge the lenses; to say nothing about the failures when some cracked through imperfect annealing, while others were found to be full of bubbles, striæ, or feathers.

"Then the 7½ achromatic objectives, with a new lathe for their flanges and mounts, &c., altogether ran into—perhaps as much as an American train does in a week—

"I won't trouble you with the details now, suffice it to say that they were done; but not before those who ordered them were dead and buried, but 'Stevens' and the old metal shops were not.

"No, cannot stop any longer to-day, another time. Good-night."

THE amount of detail which a first-class artist can get into the small compass of a 3½ by 3½ in. slide, and this without the assistance of a photographic basis, is truly surprising.—R. R. MORGAN.

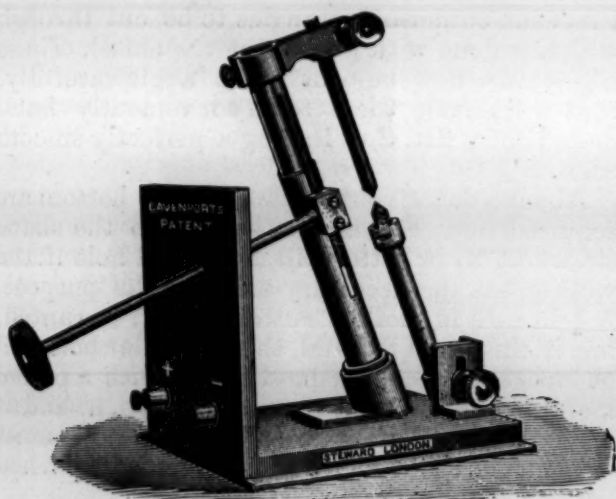
Electric Lamp for the Lantern.

WE illustrate a new and simple form of electric arc lamp which has recently been designed by Mr. G. Davenport, for use in the optical lantern, and for projection purposes generally.

The principal drawback to the use of the electric light in the lantern has hitherto been the difficulty of obtaining the necessary current; but with the rapid extension of central stations for the supply of electricity, this difficulty will soon disappear, and the convenience and advantage of the electric light as a luminant for the lantern will recommend it to all desiring a powerful and more perfect light than is offered by the lime-light.

In the lamp figured below the object sought has been to provide a lamp simple in design, easily understood, and capable of being used by persons unacquainted with electrical science. This has been very completely attained by doing away with all mechanism usually employed in automatically-fed lamps, and making the lamp a hand-fed one.

The lamp consists of two carbon holders, so arranged that while the lower carbon is automatically maintained in the proper position for burning by a spring within the tube A, the



upper carbon is fed forward from time to time as the carbon is consumed, by a rod at the back of the lamp attached to a rack and pinion arrangement.

The tube containing the lower carbon is fastened by a thumb-screw to a fixed upright plate, having a slot cut in it, so that the height of the tube may be varied and other adjustments made. The two carbons are set at an angle so that the full benefit of the arc is directly in front.

The lamp is made of such size and shape that it will fit any ordinary lantern without alteration, thus allowing of the lime-light or other luminant being used when the electric current is not available.

The rod carrying the pinion for feeding the upper carbon projects at the back of the lantern, and the only attention necessary in using the lamp is to turn this rod from time to time in a similar manner to that required when turning the lime for the lime-light.

Special connections can be supplied for joining the lamp to the supply mains, which, while protecting the terminals from contact with each other, render it impossible to connect up the lamp in the wrong manner.

The lamp is perfectly steady in working, and gives a powerful light of great intensity, capable of being varied to a greater or less degree by suitable resistances.

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The Lanternist's Den, No. XI.

BY C. E. RENDLE.

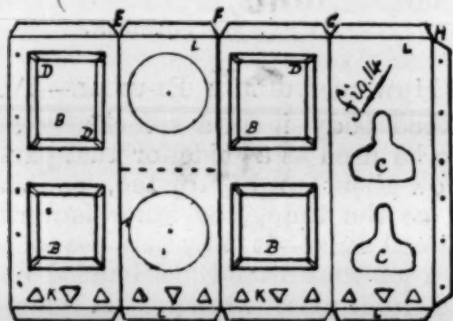
HOW TO BUILD A BI-UNIAL—IV.

THE wood body is in a sufficiently advanced stage to be used as a guide for that part of the work now about to be treated, and which is known as the lining, or inner lantern. In a professional sense—it may here be observed—this is a job that would be handed over to a tin and iron plate worker. It may suggest itself to many minds, that it is a comparatively easy thing to cut and bend metals in various shapes and forms, but it is earnestly advised to set such ideas aside. The mistake will more readily be understood in looking at Fig. 18, remembering, the while, that the four sides of this are in one piece. Indeed, instead of it being a simple task to accomplish, it is one of the utmost importance, and unless the greatest care is exercised in carrying it out, the time given to it will have been wasted, the work useless, and the worker dissatisfied.

The lining may be made of either tin or iron, and is consequently left to the choice of the reader. With regard to durability for present purposes there is no preference. However, the writer recommends which he likes best and what he has used most of, and that is, charcoal or Russian sheet iron. Charcoal iron has many advantages over all others, and the amateur, should specially rejoice in knowing that it is easier of manipulation and particularly pliable.

For this one reason alone it is good for lantern work, whilst another is, it does not readily rust, and, if kept in a dry temperature, does not require coating in any other way, its dead black surface being just what is required. The cost is possibly three times that of the others, but seeing that so little is wanted, the outlay is doubly recouped in the advantages above mentioned. Like many good things it cannot be got anywhere, and it is just possible that readers outside London, more particularly of course in small towns, will do well to order through a dealer in metals. Messrs. Pfeil & Co., of 145, St. John's Street Road, London, E.C., stock the article in large quantities. When purchasing, ask for a sheet of charcoal iron, guage 26, this will measure about 72 in. by 30 in. and is sold by weight, approximate cost of the piece is 2/- to 2/6.

The lining should be so made that when dropped into the wood body, there should be a clear air space of $\frac{1}{2}$ in. all round, and 2 in. at bottom. Cut a sheet of the iron $19\frac{1}{2}$ in. long by 29 in. wide and proceed in marking it off in facsimile



of Fig. 14. First draw lines A, of front and with a centre punch mark centres of holes $4\frac{1}{2}$ in. from both top and bottom of A. With compasses or dividers strike circles $4\frac{5}{8}$ in. in diameter, next mark for rectangular openings for doors, BBBB and jet apertures CC. The lines H, G, F, E, should be $\frac{1}{2}$ in. $6\frac{1}{2}$ in. $14\frac{3}{4}$ in. and $20\frac{3}{4}$ in. from right hand edge. The various opening must correspond in size with the woodwork. By tying a piece of string round the body at foot of condenser holes, the distances of the openings will readily be found. The rectangulars to be marked in double parallel lines $\frac{3}{8}$ in. apart as shown at DD, and in cutting, the inner line will be followed, the outer one being the actual size of door. At each corner it will be noticed the metal must be slit from the inner to the outer, as the $\frac{3}{8}$ in. here will have to be doubled over to make a nice smooth edge. A hard steel scribing point will be found best for the marking on metals. The various pieces will now have to be

cut out. A metal, or cold chisel, and a hammer is all that is required for the cutting process. The chisel can be made very easily from a 3 in. length of $\frac{1}{4}$ in. flat steel, $\frac{1}{2}$ in. wide, ground away at one end on the grindstone to right angles, and afterwards hardened and tempered in the ordinary manner, be particular in having a sharp cutting edge.

In the absence of a suitable anvil and lead cakes, the next best thing to get will be a piece of flat hard wood, upon which must be placed the sheet of metal. Commence by cutting out the circles, by placing the sharp edge of the chisel within $\frac{1}{16}$ in. inside the line, then striking it a moderate blow with the hammer, and the same again, and again, until the entire circle has been travelled, when the sheet may be raised and the part thus cut, removed by a sudden smart blow in middle of circle. This part of sheet must now be placed on a flat iron or stone and the jagged edge brought flat again by gently hammering with a small flat faced hammer. If this is done as directed the line of dividers is still to be seen and must be filed out, with a smooth cut 10 in. file. When each circle has been similarly treated, the back apertures and afterwards the doors must be done in the same way, it being understood that each must in its turn be trimmed up to lines, and that each corner of rectangles to be cut through which is done with one cut of the chisel. These edges must now be bent up to angle carefully, that will enable them to be conveniently hammered down flat, thus leaving a perfectly smooth edge.

About a dozen vent holes along the bottom are required and can either be cut to the shape shown at K, or better still is a round hole if the worker has the necessary tools for the purpose. A $\frac{1}{2}$ in. or $\frac{3}{8}$ in. hollow cutter is what is wanted, but if this is not to hand, the triangular hole will be easiest to accomplish. Cut out with a pair of metal shears incisions shown at E, F, G, H, and at each corner and afterwards five small holes must be punched down each end for rivetting up when bent to shape.

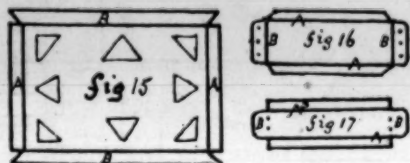
Both top and bottom will have to be edged with wire, which should be about guage 10. Lay a straight length along line L, place in vice and hammer over until a good rolled edging is obtained, this to be repeated at bottom.

The lining is now ready for bending, first commence with overlap H to right angles. It is advisable to do this in the bench vice a few inches at the time, the greatest care being taken, that the line is well on the corner at each bend, if not, it will be found to be out of true when fully bent up and cause much trouble in getting

right. When satisfied, that the overlap is true, proceed with the bending to exact right angles, at each of the other lines, G then E and lastly at F.

A square block of wood the length of the lining will be found useful in doing this, as the corners can then be hammered, thus facilitating a good shape. The rivet holes should be found opposite each other, into which must be inserted some small $\frac{1}{4}$ in. copper rivets from the inside, hammering them well over on the outside.

We proceed now in making the bottom, a plan of which is shown at Fig. 15. Prepare a



piece of iron $9\frac{1}{2}$ in. long and 7 in. wide, round which draw a line $\frac{1}{2}$ in. from the edge. Each corner to be shaped and trimmed as they appear in the diagram. Make eight holes well within the inner line; taking the ends first, we bend at A to right angles, this is best done by fixing in vice against line, bringing down the metal square, and, as before shown, can be best achieved a few inches at the time, using a hammer to well square the edges. Afterwards the sides BB must be served in the same manner, the overlap of course is to be hammered round corners. This should now fit tightly into bottom of lining, and, if it does so, will not require further fixing.

Two jet shelves are to be made and placed in position, plan out as at Fig. 16. Each piece of metal must measure $10\frac{1}{2}$ in. long and be 4 in. wide. The side lines AA to be drawn $\frac{1}{2}$ in. from edge, and BB 1 in. from each end. Cut away corners at cccc, well-rounding them with a smooth file. Take a piece of flat metal a little thicker than that being used and place along one of the lines A, screw this in vice so that the edge of the metal (which we will call the stop) comes flush with the vice jaws. First hammer down to right angles this overlap, and when this has been done it must be placed higher in the vice, still keeping the stop in its position, then gradually hammer over the stop what edge of metal remains, thus forming a groove; care should be taken in seeing that it is well-fitted and kept straight, when the stop can be removed and placed against the opposite line A, which is also to be treated. Next place in vice one end at line B, and bend sharp down outward, also to right angles. Make a couple of rivet holes as at c. These two shelves should fit tightly when in position, the end flap c being bent inward or outward until they do so. Corresponding holes will have to be made in lining for rivets to fit

in. Care must be taken in having each shelf lay perfectly flat. The rule is for line B, Fig. 16, to lay flush with bottom edge of jet aperture, and before marking the holes it is advisable to get them in their true position by means of spirit level, when the holes may be marked and made, and afterwards riveted in, heads of rivets to go inside. An ordinary flat iron or similar stake to be placed against the head whilst the hammering is going on.

We now take the top or hood. There is no rule to govern what this should look like, the chief and only thing to study being perfect ventilation. The Rose top is comely to look upon when made by the skilled mechanic, but the amateur might experience a difficulty, it is therefore recommended to proceed in the following way to make a most simple and effective hood, which not only looks in harmony, but is efficient in all particulars. Cut two pieces of iron $7\frac{1}{2}$ in. long and 3 in. wide. Round the corners to a semi-circle. Three rivet holes to be made down one side of each piece $\frac{1}{2}$ in. from edge. Now bend them over a round stake till they are semi-circular, place them in the lining, one on each side about 1 in. down. There will be a margin of $\frac{1}{4}$ in. at each end; holes are drilled in the lining corresponding with those in these draught leaves, and if they agree as to shape they can be riveted into position. Another piece of metal 12 in. long and $7\frac{1}{2}$ in. wide is next marked as Fig. 17. Lines A A, $\frac{1}{2}$ in. from sides B B 1 in. from ends. Whilst in the flat the two sides will have to be wire-edged as in the case of the top. The wire to be placed along line A fixed in vice as before and neatly hammered over. The ends are to be left bare or just as they are. It will perhaps be wise before proceeding to try each end, and see they go down properly between the ends of draught leaves, and front and back; for if any alteration is essential it can now be made.

It will be noticed in Fig. 18, the shape this is intended to be, therefore bend it accordingly, leaving it just large enough to allow it springing into its place. It is not advised to make this a fixture; but rather to have it removable at will, for cleaning purposes. All that now remains in the iron-plate line—at present at any rate—is the lining of the doors. In cutting the pieces for this purpose, let them be about $\frac{3}{4}$ in. longer than the door to allow for the bend as shewn at A, Fig. 18. This bend of course is to cause



the air to pass between the wood and iron. Fig. 18 is a complete drawing of the lining as described in this chapter, and I think speaks for itself; B, draught leaves; C, hood; D, jet aperture; E, jet shelves; H, vent holes; K, doors; L, lining of doors; F, condenser holes.

To be continued.

ERRATA.—Page 175, line 9 from bottom of first column: for $4\frac{3}{8}$ in., read $4\frac{1}{2}$ in.; page 199, second column: in lines 2, 13, 19, for slide read stiles.

—:O:—

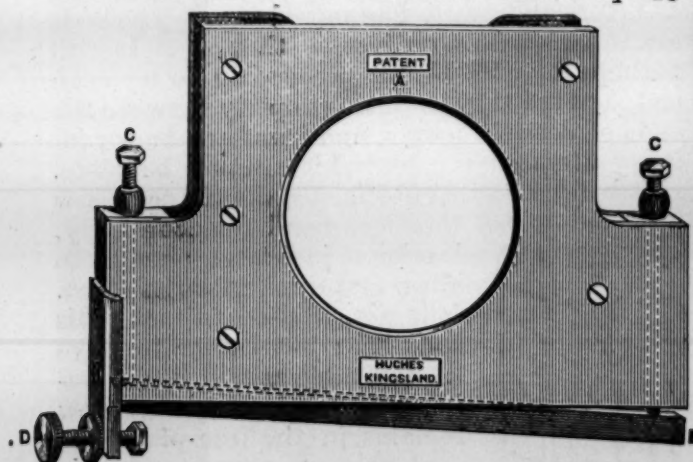
New Apparatus, &c.

LINEN SLIDE-BINDERS.

FROM time to time many have been the enquiries for a binder that will not start off from the glass, or quickly become worn. Mr. William Tyler, of Birmingham, has just introduced a binder that will answer these purposes. It is thin, strong, and when dipped into hot water and applied to glass, sticks very firmly.

CENTREING-REGISTERING CARRIER.

THE new adjustable carrier, which has been invented by Mr. W. C. Hughes, of Kingsland, will be found to be of great assistance to those who have any difficulty in the registering of a bi-unial or triple lantern. It consists—as will be seen from the cut—of a carrier with a tilting base and an adjustable stop, which presses against the lantern stage. The face A of these carriers is cut either with a square



or circular opening, and all of each shape are of exactly the same size. The opening serves the purpose of a mat, for which reason the slides are best mounted with very narrow mats. To render the lantern stages exactly parallel and of the same height with relation to the condenser the base of the carrier B is adjustable by manipulating the screws C C. With a carrier of

this class, the coincidence of each disc can be quickly perfected.

SLIDING CARRIER.

In last journal we spoke of Mr. Hughes' new sliding carrier, but as the block arrived after



we had gone to press, we here give the illustration. It will be observed that the slide rises up in its carrier when the slider is drawn over the inclined plane fixed at either end; thus enabling the slides to be quickly removed without fingering the glass.

"LOTHIAN EDUCATIONAL LANTERN."

THE new lantern of Mr. H. Baird, 15, Lothian Street, Edinburgh, is very convenient, and is in a few respects, not unlike the general appearance of instruments we have seen in America. The parts are strong and serviceable. The con-

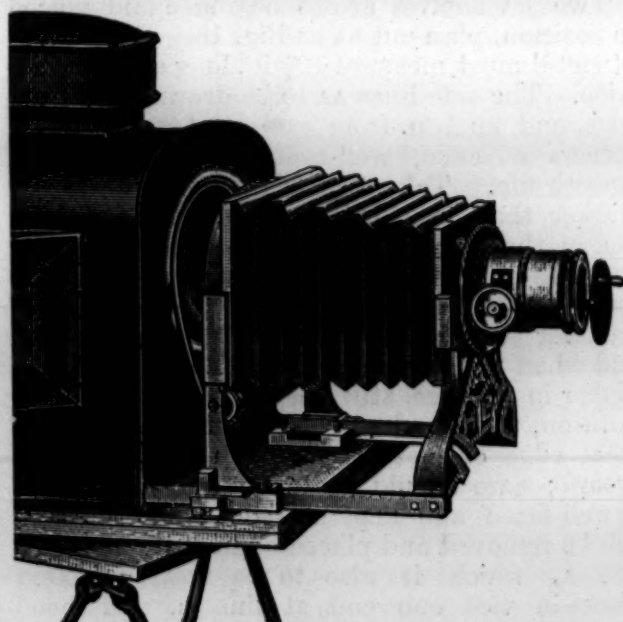


Fig. 1.

denser is fastened in its place by a bayonet joint. The stage, slide spring, and bellows front (Fig. 1) are detachable; so that for scientific work there is a clear way from the condenser to the lens, between which is inserted an

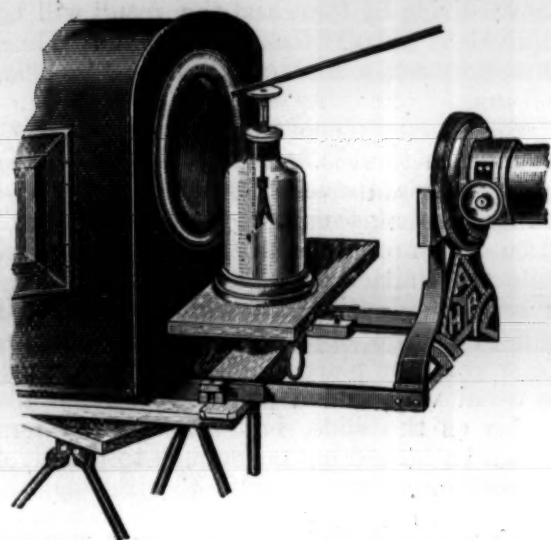


Fig. 2.

adjustable table (Fig. 2). The body of the lantern is of sheet metal fastened with copper rivets.

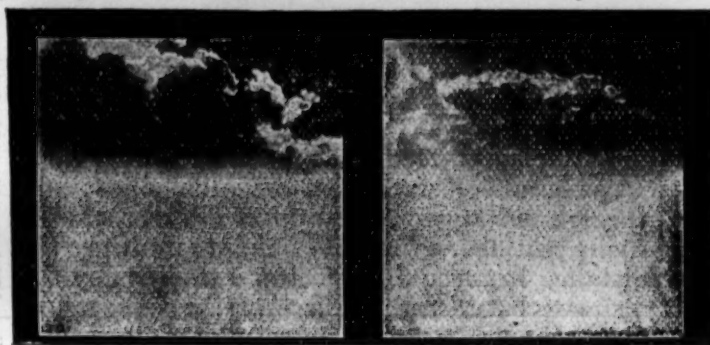
STANDARD SCREW THREAD FOR LENSES.

MESSRS. TAYLOR, TAYLOR & HOBSON, of Slate Street, Leicester, and Southampton Street, W.C., have for some time past been advocating the use of a Universal standard thread for all lenses, together with their form of thread in which the thread starts abruptly, thus rendering it a simple matter to put two screws together, as they have only to be held together at two arrow marks on, say, flange and mount, when by a turn the threads will at once engage. This firm have set up new machinery, and are prepared to alter the screw fittings of 20,000 lenses during the next three months; each lens to be returned the day after it reaches them. By this means all lenses will fit one flange if necessary, those of small diameter being fitted into nesting diaphragms. Up to three inches in diameter, there are (Universal standard) twenty-four threads to the inch; above that diameter, twelve to the inch. On application, Messrs. T. T. & H. will send a scale and gauge, by which anyone can ascertain if their fittings are "standard" size. These scales can also be obtained from most dealers in photographic and lantern apparatus.

CLOUD NEGATIVES.

Most lanternists are aware of the enhanced effect given to a lantern slide in which clouds have been printed in. Hitherto the difficulty has been about the clouds, for few seem to take the trouble to obtain a suitable set of negatives of such. Messrs. Butcher & Son of Blackheath, are now issuing cloud negatives; and by

following the instructions contained in each packages, slide makers will have no difficulty in



rendering a certain charm to their transparencies which, without clouds, would be entirely wanting.

To Ascertain the Focus of a Lantern or other Objective.

BY C. GOODWIN NORTON.

MANY tables have been published by which the lanternist is enabled to ascertain the relation of the size of disc to the distance from the lantern and to the focus of the lens, but few lanternists know, within any degree of exactness, the focus of their objective.

To ascertain the focus of a compound or double achromatic lens, one well-known authority gives the following directions:—"Focus some very distant object on to a white surface, measure carefully the distance from some point on the lens mount to this surface; now turn the lens round end for end, and repeat, measuring from the same spot on the lens, add the two distances together and divide by 2: this gives the equivalent focus," or, in other words, the distance the lens must be placed from a surface to bring parallel rays to a point on that surface.

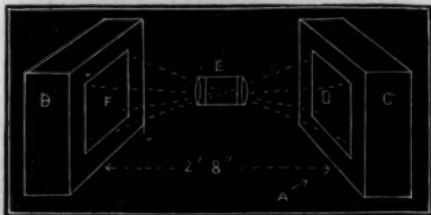
There are several mechanical difficulties in the way of measuring the focus by the method above described, the want of a support on which to rest the lens at the proper angle, the absence of a convenient object to focus (especially in London), and the inaccuracy of the result unless the object be very distant, as the distance between the lens and the object that is to be brought to a focus has a material effect upon determining the length of the focus. Take one example: suppose the lens is held 6 ft. from a gas flame, and the rays brought to a focus if held 8 in. from the surface on which they are projected, the lens would be accepted by many as that of 8 in. focus, whereas it would really be about $7\frac{1}{4}$ in. so that when it is applied to the lantern, the tables cannot be made to agree with the distance or size of disc, and yet this is a method frequently practised by so-called opticians.

As before stated, the difficulty is to find a suitable object sufficiently distant to get the rays something like parallel. The sun or moon would be the best, but are seldom to be seen when wanted, and it is difficult to find at night-time, when most lanternists make their experiments, a nearer object which reflects or emits light enough to focus by.

When the distance between the object and the lens is known, the apparent error can be easily rectified. The rule being to multiply the distance between the object and the lens by the distance between the lens and the image, and divide the product by the sum of the two distances, thus—in the above example:—

$72 \times 8 = 576 : 72 + 8 = 80 : 576 \div 80 = 7.2$ inches ; the equivalent or solar focus. Strange as it may seem, it is a most difficult matter to procure such an everyday thing as a common spectacle glass of any desired focus. If one of 24 in. is inquired for, 21 or 22 in. will certainly be supplied, and this because most spectacle sellers and dealers in optical instruments test their lenses in this way, and make no allowance for the error caused by the nearness of the object upon which the focus is tried. The wholesale opticians and those who know their business have another way of trying lenses, namely, by applying a concave or diminishing glass of known negative focus, which will bring a distant object, usually a number of lines, to its normal size.

There is a simple method by which the focus of a lens can be determined by the aid of the lantern itself. On an ordinary table place two



boxes B and C about two feet apart, or one box and the wall of the room will answer ; the object being to get two parallel surfaces. Draw a square, D, three inches each way on a piece of white paper, and pin it on the side of the box or wall ; place the lens, E, between the two surfaces, supporting it on—say a couple of books. Throw a strong light on the square by means of the lantern placed at A, using half the condenser only if no spare objective be available. This will cause an image to appear on the other surface F. Now move the lens or the surface, or both, until the image is the same size as the object or square (fig. D), and, of course, in focus measure the distance between the two

surfaces ; divide by four, and the result will be the equivalent or solar focus of the lens. Thus, distance between B and C, 32 in. $\div 4 = 8$ in. solar focus.

It will at once occur to the reader that granted this method is correct, which is doubted by some, there are several less clumsy ways of attaining the same end, *e.g.*, the "square" could be drawn on a sheet of ground glass, and the light transmitted through it on to the surface ; or in the daytime the window sash could be utilised as the object, or a slide of known diameter could be placed in the lantern stage in the usual way, and a picture projected the same size as the slide, but very few lantern fronts can be racked out far enough to permit of this being done.

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The Exposure and Development of Lantern Slides.

(Continued from page 195.)

BY DUNCAN MOORE.

The quality varies proportionally to its transparency, so any plates or developer that will excel in the production of translucent deposit in the image will make the best lantern slides. In the wet collodion days, pyro development would produce negatives, the image being so fine a deposit that it became virtually a stain, not the slightest granulation being visible, even when examined by considerable magnifying power. This peculiar quality was forfeited when iron development superseded it, and for ordinary printing purposes, on more or less coarse surfaces, these little delicacies of image were not of much importance. Photographers were not so exacting as to quality in the early days as they are now, when every little variation of tone is criticised. The best quality of lantern slides are undoubtedly produced by full exposures that necessitate restraining, rather than accelerating agents added to the normal developer for their production. In saying full exposure, it must be clearly differentiated from over exposure, which is fatal to good effect. In development the image should make its appearance soon after the application of the developer and go on steadily increasing in detail and strength, without hesitation or requiring a fillip by the addition of ammonia or other alkali ; when the lights are sufficiently dense, the very deepest points of shadow ought to remain quite free from veil or deposit of any kind, looking by the dark room light like white

spects, or, perhaps, more like an under-exposed negative, as detail invisible by ruby light will show when the plate is fixed and cleared. It undoubtedly requires some experience to judge exactly how far development may be carried without veiling the shadows, but the fact of knowing what is required will soon set the operator right in this particular. It is a good plan to stick a small bit of opaque paper on the film of the unexposed plate, on some corner where it will not interfere with the picture, and then on development the covered portion ought to remain absolutely unacted upon; the colour will indicate not only if we are working in a safe light, but, by contrast, will indicate the least deposit on other portions of the negative, so that if we find that a veil forms before sufficient intensity is gained we know there is a screw loose somewhere, and that either our plates, developers, exposures, or light requires looking to. The proper colour and density should be obtained by the first development, as already mentioned; but if the least additional strength would be an improvement, intensification by means of bichloride of mercury, followed, after thoroughly washing, by a solution of sulphite of soda; this adds a slight density of a nice colour, but my advice is, get all the intensity you require at first, and do not mess about with the slide afterwards if it is possible to avoid it. The final test of the clearness of a slide is when dry to lay it face-down on a smooth piece of white paper, which will show every detail in the shadows, however delicate, and the least trace of fog is ruthlessly exposed.

With regard to the times of exposure, all depends on negative light and plate, and as they all vary, nothing definite can be said on the point. Sometimes a negative is denser at one end than the other, which must be equalised in the slide. If contact printing is adopted by covering the thin end of the negative for a portion of the time of exposure with any opaque substance, a piece of cardboard, for instance, will remedy matters. If the copying is in the camera, a piece of dark paper moved about over the reflector during part of the exposure will effect the same results; it is quite easy to examine the image on the focussing screen, to see where the dark paper is required; but it will not do to leave it on the reflector without movement, or a hard line will be found where it ends on the slide, pushing it gently to and fro will answer every purpose. By this means very unequal negatives may be made to give even transparencies. As a general rule, a gelatine plate is coated tolerably even, but sometimes the illumination of the subject is

much stronger on one part than another that a little equalising will effect considerable improvement. The fault induced by a too dense image is loss of atmosphere—under exposure has the same effect.

The want of atmosphere in many lantern slides is a very prevalent fault, the fear of making them too dense, or veiling the shadows, has caused the makers to run to the other extreme, and get brilliancy at the expense of atmosphere. There are few photographers but know the value of atmosphere in an ordinary print, but somehow or other they overlook it in lantern slides. There is no doubt but there exists a difficulty in hitting the right means between under and over exposure, but an operator should not be satisfied until he has done so. Once get to know the exact appearance of a rightly exposed image and the difficulty will be surmounted. In copying, whether by camera or contact, no light should be allowed to pass through *any portion* of the negative but that required for the slide; this may be accomplished by putting a black or red paper mask over the negative, seeing that the edges of the glass are well covered. It is astonishing what an amount of light will penetrate through the edges, especially in contact printing by artificial light. I have seen many a transparency ruined by neglecting this precaution.

The dodges used in ordinary printing to obtain atmosphere are well known, from papering the back of the negative to putting the distant portions out of focus, but I have not yet met anyone who advocates an out of focus distance for a lantern slide. I am afraid a slide from the blurred impressionist negative would not meet with much appreciation from a lantern audience. There is no manner of doubt that at any rate the *foreground* of a good slide *must* be absolutely well defined, some little falling off in definition may be *tolerated* in the distance, but very little, much better to have it all sharp together and trust to development and exposure for atmosphere. Mere suggestion is insufficient to give satisfaction in a lantern slide, whatever it may be in other photographs; there is considerable difficulty in applying the *ars celare artem* principle to pictures that have to submit to the amplification of a lantern slide. I do not pretend to say it is an impossibility, but do say that it is improbable that a small picture can be "dodged" by fuzziness, or out of focus contrivances, to look right when enlarged on a fifteen or twenty foot screen. At present our motto is definition, leaving all atmospheric effects to a good exposure and skilful manipulation.

Metallic Lantern Screens.

BY W. H. HARRISON.

ONE portion of the recent invention by Mr. Anderton in relation to lantern stereoscopic projection, may have the effect of drawing more attention to the subject of screens. He was under the stern necessity of saving all the light he could, to compensate for that lost by the the intervention of polariscopic elements, therefore he introduced the novelty of facing a screen with mat silver foil. At an experiment tried at the present Exhibition of the Photographic Society, the polarizer was removed in order to see what kind of an image the screen yielded for ordinary lantern pictures, and it is recorded that the brightness and the clearness of the image were remarkable. Some more and prolonged experiments should be tried in the same direction, to make sure whether the general colour of the image on the screen is as pleasing with silver as when a whitewashed wall or other ordinary screen is used, also some comparative experiments are necessary to ascertain whether coloured slides come out as pleasingly upon the silver surface as they do under the usual conditions. The Photographic Society might have done well to settle these points while it had the silver-faced screen in use, for brilliancy of image is one thing, perfection of colour is another.

Should the image have too metallic a lustre to be altogether pleasing, the invention may yet lead to improvement of the ordinary images should a screen with semi-metallic lustre be found to increase the light, without deteriorating the colour of the picture. By semi-metallic we mean a lustre something like that of artificial pearls, which consist of large hollow glass beads coated inside with fish-scales ground up in a suitable medium, with which medium a screen might be painted.

The great founder of photography, Nicéphore Niepce, lived near the little town of Châlons on the Saône, one of the best of the Continental seats of the industry of making artificial pearls, which pearls were invented by a Frenchman of the name of Jaquin. The scales of the bleak—a little fish common in the Thames, the Rhine, the Saone, and in most rivers of Europe—are thrown into a solution of ammonia which helps to preserve them on the one hand, and gives them a degree of softness and flexibility on the other. The liquor employed to make artificial pearls is an article of commerce, known as *Essence d'Orient*, or oriental essence. The chief of the few seats of the artificial pearl industry

are in France, but there are a limited number elsewhere. The products differ in quality.

Before quitting this fishy subject, some lantern effects may be noticed which were produced some years ago at an exhibition of articles of luxury in Nice, during the English season there. One of the rooms connected with the exhibition was normally kept in darkness, but its walls formed an aquarium, behind the glass sides of which were numerous fish with silvery scales, common in the Mediterranean. Out of sight, above the tanks, were electric lanterns, casting their beams upon the silvery sides of the fish, so that the room was chiefly illuminated by means of these living mirrors, moving restlessly to and fro, and casting flashing beams of light among the spectators. It was a pretty fantasy, eminently French in its conception and execution.

In making artificial pearls sometimes the lustrous matter is suspended in gum, and the outside of the little glass globe containing it, is deadened with hydrofluoric acid.

An opening seems to exist for experiments to determine the best surface for a lantern-screen between that of dead white and metallic lustre.

When I saw Mr. Anderton's apparatus at work four or five months ago, there was plenty of daylight in the hall, so that it was impossible to form any opinion about the artistic effect of the colour of the screen.

Supposing dead metallic screens to be advantageous for ordinary purposes, the Germans have been clever in making "silver paper" of tin, which is economical. This paper is used for wrapping tea and edible articles, consequently, under the German law, it must not contain more than one per cent. of lead. The full details of the manufacture of this paper had been kept somewhat a trade secret, until Herr A. Harpf gave the particulars in a German periodical; an abstract of his statements appeared recently in the *Proceedings* of the Institute of Civil Engineers. Herr Harpf was for some time in charge of a manufactory of the "Argentine," as the tin deposit is called.

The manufacturers start with a solution of tin in hydrochloric acid, and get the metal from waste tin materials, such as bearing-metal turnings from railway repairing shops. For lantern screens it would be cheap enough to start with already purified stannous chloride, which should be placed in vats in which plates of zinc are suspended, when, if all conditions are right, the tin precipitates as a grey spongy mass, and hydrogen is evolved. The spongy mass is dried, and rubbed through a sieve to a fine dust. The author says that two methods are employed of coating paper therewith:—"In the first, 4 kilos

of wax, and three-quarters of a kilo of potash are boiled with 50 kilos of water, and the melting fluid so produced is stiffened to a thick paste by stirring the tin precipitate into it. In the second, 75 litres of freshly-made 4 per cent. starch solution are mixed with 750 grammes of a wax solution, prepared from 5-lb. of wax and 1½-lb. of potash dissolved in hot water, and 25 kilos of Argentine are added. The paste so obtained is printed by rolls on to paper, which dries to a dull grey tone, but becomes bright when burnished by passing between hot calendar rollers, when it exactly resembles tinfoil." What is wanted for Mr. Anderton's lantern screens is a state of brightness midway between the two extremes just mentioned.

Real silver paper is sometimes made by covering white paper with a priming of white lead and size, and cementing silver leaf thereupon.

The powdered aluminium of different degrees of fineness, now obtainable in the market, seems to be about the best substance for use in experimenting in the direction now under notice, especially as it is not attacked by sulphur in the air. Used pure, it perhaps gives as high a metallic lustre as will ever be required, and its lustre may conveniently be reduced, if necessary, by admixture with a suitable white substance, preferably sulphate of barium, which is practically unchangeable. The powders can be applied as a paint in any suitable vehicle, such, for instance, as size. The Lantern Society might do useful work in experimentally investigating the merits of different semi-metallic screens.

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Experiences with Hill-Norris Transparency Plates.

BY EDGAR CLIFTON.

PHOTOGRAPHERS have, of late years, been so accustomed to the use of ready prepared plates, that even the most devoted advocates of the collodio bromide process have, almost without exception, quietly dropped it in favour of the more simple, and almost as satisfactory gelatine plates which are now sent out by the leading makers. It is true that ready prepared collodion emulsion of most excellent quality has all along been obtainable, but it was of little value to the bulk of modern workers, who not only are unable to coat a plate in the dim light of the dark room, but who have never passed the *pons asinorum* of collodion work: the rendering of a piece of glass chemically clean. Again, the extreme cleanliness necessary during coating and

drying for the avoidance of spots and streaks, together with the inflammable and, to many, unpleasant nature of the solvents, has caused the almost total disuse of home-coated collodion plates. Now, however, the enterprise of our friends in the Midlands has placed in our hands a plate which could only be produced by the photographer himself after years of experiment, and at a price which is almost as low as that of its rival gelatine. The writer has used a considerable number of these plates, and finding the results quite satisfactory, offers the following remarks upon their treatment:—

Exposure.—This, of course, varies enormously according to density and colour of negative, light, etc., the nearest gelatine plate which I can compare with it being the Mawson.

Development.—Pyro-soda, hydrokinone, and amidol, all answer well. I prefer pyro-soda, and find that any good formula negative will do. Care should be taken that the temperature of the developer is not too low, the makers say not lower than 60° Fahr., 70° or even higher may be used with advantage. If, however, the temperature be too high, there is a danger of the film slipping off the plate altogether. I have found this to occur when the temperature of the developer was between 90° and 100°. The progress of the development must be judged by transmitted light, as the light colour of the reduced silver will often make it appear to the eye accustomed only to gelatine plates as if development were only just commencing, when, in reality, full density has been obtained. Development proceeds very rapidly, so that the image should be examined soon after immersion of the plate in the developer. The film being much more transparent than gelatine enables the density to be judged with ease. Do not over-develop. Thin, rusty-coloured pictures are usually the result of a low temperature during development. The appearance of a slide in the hand is little indication of its value when projected upon the screen. Some of the slides which I have made upon these plates have looked thin and poor until shown by the lantern, when they have appeared perfect in colour and density.

Fixing is performed in the usual way; there is, I think, no advantage in the use of cyanide except a slight saving of time in washing, and it is a substance which few photographers would care to reinstate in their dark rooms.

The transparency and brilliancy of slides made by the collodion process are enhanced by varnishing, either with negative varnish well thinned with methylated spirit or with the crystal varnish sold for positive work, the latter

is used without heating the plate. Varnishing also serves to protect the very delicate surface of the film from accidental abrasion during mounting and binding.

If, as may sometimes be the case, the transparency is lacking in density, intensification must be resorted to. The ordinary wet collodion re-developer consisting of an acid pyro solution with free nitrate of silver added, may be used after fixing to build up the image to almost any extent, although the indelibly stained digits resulting therefrom will probably deter most modern amateurs from employing it. An acceptable and simple substitute will be found in bichloride of mercury, followed by ammonia or sulphite of soda. Owing to the extreme thinness of the film, there is little danger of staining, even if only a moderate amount of washing has been given after fixation and between the bleaching and blackening processes. It may be asserted that mercurially intensified images are not permanent, and such is probably the case. That they are not exceedingly fugitive is proved by the fact that slides so treated have stood the test of nightly use in a lantern illuminated by a powerful arc light for over a year without showing the slightest change.

One great advantage is possessed by collodion slides as compared with gelatine when used in a lantern illuminated by the electric arc or other powerful heat producer, and that is permanency of the actual film. After a few months, or even weeks use, the gelatine becomes brown from simple baking, while the collodion remains unaltered. There is also less chance of undissolved bromide of silver remaining in the film through imperfect fixation, and causing degradation of the clear portions under the combined influence of heat and light.

One word of caution. Deal tenderly with the collodion film, whether it is in a wet or dry condition. On no account must a brush or pad of cotton wool be used upon the surface during development, or total destruction will be the result. A soft camel hair brush may be used for dusting before varnishing or mounting, but even this requires caution, as any loose particles of grit or sand will cause fine scratches if dragged across the film by the action of brushing. A little practice will, however, give the necessary delicacy of handling, which, in wet collodion times, was one of the earliest parts of the young photographer's training.

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Proverbial Philosophy,

BY A LANTERN LECTURER.

LIKE most other proverbs, the maxim that "Wise men make proverbs and fools repeat

them" is a very old one; old enough, in fact, to know better: moreover, the truth of it is very much to be doubted. Surely those who are interested in lantern matters are wise men, but do they ever make proverbs? Again, do not all lecturers frequently quote proverbs, and yet are they fools? Obviously there is something wrong somewhere. We will just consider one or two proverbs which will clearly indicate to us that the authors of them were in a shocking state of ignorance with regard to lantern matters.

For instance, no experienced lanternist would ever have made so sweeping an assertion as "Tread on a worm and it will turn." Sometimes, of course, it will; sometimes it won't; it just depends. Tread on the rubber tubing and it turns—the gas out; but tread on the objective flange and the worm never turns again.

Too, where is the sense in saying that "He laughs loudest who laughs last" when any operator, worthy of the name, knows his duty well enough not only to laugh the longest and the loudest at the lecturer's attempts at a joke, but also to start the laugh first.

We all know that "Necessity is the mother of invention," and also that "Half a loaf is better than no bread"; but for all that a combination of the lime-tongs, a hair pin, a bit of string and the kitchen poker make but a poor substitute for the mislaid cylinder key. The makers of these proverbs may have been wise men, but evidently they were not lanternists. Here and there, however, examples occur which seem to indicate that they must have had some slight acquaintance with the details of lantern management. We will quote and comment on a few in illustration of this belief of ours.

"As the fool thinks so the bell clinks." Of course, if the operator stands dreaming when he ought to be changing the slide, naturally the lecturer has to ring him up. "Good things go in small compass" is a motto which the purchaser of a lantern should bear in mind, but he must not forget that "A little pot is soon hot." In connection with this matter it is true that "It's not the cowl that makes the friar," and it is also true that it is the ill-ventilated rose-top which converts some lanterns into excellent cooking-stoves. When Friar Bacon invented the Magic Lantern he never anticipated that it would be turned into a sort of bacon fryer! (Christmas comes but once a year).

"No one knows the weight of another one's burden," but to any two able-bodied individuals anxious to learn, I can offer a job as porters to shift my triple about the country.

"Pay as you go." Walker! take my tip, and make them pay as they come in.

"Give a rogue a rope and he'll hang himself."

Not a bad idea this, shall try it on with my twenty-foot screen next time it won't behave as a decent screen should. Shall not get cross and drive nails in where the authorities do not allow them, but shall just pile up the screen, nails, rope and hammer together on floor and leave them to fight it out.

"Out of sight, out of mind." M'yes, those who cannot see the screen properly are apt to get mad.

"He who sings drives away sorrows." Only once did I ever venture to sing to an audience at a lantern show, and it certainly did have this effect. The sorrows of my audience were driven away, but they did not leave the Hall alone; and the worst of it all was that the idiotic local paper headed its account of my lecture as a "Sudden Panic at the Town Hall."

"Two heads are better than one," but even one is fairly effective if the owner of it keeps bobbing up and down in front of the lantern.

"Old birds are not to be caught with chaff," and the experienced lecturer will never reply to the small wit which the semi-darkness of the lecture room will sometimes evolve.

"Habit is second nature." This is well worth remembering. We once knew a man who was suddenly called upon to do a lecture on a temperance subject (it wasn't his proper line) and in the middle of it he gave the whole thing away by trying to blow the froth off the usual glass of water before imbibing it.

"Longest way round is the shortest way home," that is to say, if, for economy's sake, you despatch your gas cylinders via Berwick, Bodmin and Broadstairs, you probably do get home earlier than you expected. "Owing to unavoidable circumstances to-night's lecture is postponed."

"All is not gold that glitters," and some of it isn't even brass, although the catalogue does say "Extra, double, superfine, solid brass fronts." On second thoughts, however, the brass is there right enough, but it is not on the lantern front.

"Handsome is as handsome does." Tip the hall-keeper, and on the conclusion of your lecture one individual at least will be ready to praise your efforts as an unqualified success.

"A good thing is soon snatched up," and so do not leave So-and-so's Regulator lying about (adv't.)

"Children are uncertain comforts" at a lantern show. No doubt about that.

Finally, "A man may be a fool and not know it," but if he takes to lecturing, candid friends will have pity on his ignorance, and soon make the matter quite clear to him.

The above examples are quite sufficient to show how little consideration lanternists have

received at the hands of these proverb makers. Now that all wise men are, or ought to be lanternists, it is only right and proper that we should have proverbs of our own; so, here are a few:—

There's a reason for roasting limes.

A very big disc is a very big risk.

A rolled up screen gathers no dust.

A turn in time saves the lime.

Too many slides spoil the lecture.

Take care of the lens and the mounts will take care of themselves.

A hiss isn't as good as a smile.

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A Lanternist's Diary.

(Continued from page 130.)

BY AD-AMICOS.

JUNE 20, 1874, fell upon a Saturday, and having little to do at this time of year with exhibitions, there was nothing to prevent our tumbling out of bed at an early hour, which would enable us to carry out a resolution made some time previously to the date above mentioned, to the effect that we were to rise at two o'clock on the morning of the 21st that we might enjoy a long looked-for treat, which had been strongly recommended—that of standing upon Champion Hill, in close proximity to Dulwich, and seeing the sun rise on the longest day.

As the Spiritualists say, "the conditions were favourable," and so they proved to be on that never-to-be-forgotten morning.

As a jewel in its setting, so is a happy reminiscence in the memory, out a shining light. "But," you say, "lights are often accompanied by shadows." Yes, too true; and it's as well, perhaps, that it is so, for here the shadows tell the chronicler that only he and one other are left out of the five that made up the merry party of the walking experience referred to. Oliver Wendell Holmes's lines are uppermost in the writer's mind as he looks back:—

"The boys we knew, can these be those?

Their cheeks with morning's blush were painted.

Where are the Harrys, Jims and Joes

With whom we once were well acquainted?

"The boys, we were, 'the boys' we'll be

As long as three, as two are creeping;

Then here's to him—ah! which is he?—

Who lives till all the rest are sleeping?"

* * *

George Coombes was a 'scape-grace, but an artist, and, it may be added, a genius. Of the

former (*dis*) qualification, something may be said in a future paper, but of the latter, many and many a round of applause received during our lantern experiences has been due, not so much to the photographic production on the screen, or the lantern, or the lecture, or the incidental music employed as to the magic touch of George Coombe's brush. And while it was the intention of bringing away some negatives if circumstances permitted on this occasion, the embellishment of the show was always at heart, —that, indeed, was of minor importance beside that of having George Coombes standing amongst us, that he might place the colours shown him by that only perfect artist, Dame Nature, upon his mental canvas.

At the time and place named, the expanse of green pasture and meadow-land extended to a considerable distance, the country being flat as far as the eye could travel; and it was here we stood and saw the first sign of day dawn, which appeared at 2.40 a.m. At 3 o' the clock, the sun just touched the ridge of the horizon. Some distance to our right, but clear of the field of view, were clumps of pine trees. The tops of these appeared to be the first objects in sight that caught the sun's rays. They looked, in the subdued light, to have strips of fringe hanging from the topmost branches, a beautiful admixture of silver and gold in careless mingled fashion.

To the left, the chimney-pots of two or three mansions presented themselves with gilded edges. And as the sun came further out from his hiding-place out the streaks of purple cloud, turned pink and yellow and crimson, with just here and there a touch of blood red, that told of approaching day.

Presently, our friends to the right, the pines, were lighted half way down, which gave their rich green clothing, still wet with summer dews, a double charm. Presently they were illumined right down, and presently two colours were thrown o'er the land such as painter has never yet matched. Presently the flowers of our childhood awoke. First, the daisy, with her button'd centre of "frosted gold," and then buttercup, her field companion, whose concaved yellow leaves looked golden richly burnished. Presently again, away up went a skylark, then another and another, till the morning air was filled with music. Crows began to congregate in patches, knowing full well where the early meal was to be found. Cattle rose and stretched themselves—in short, all nature awoke and arose with automatic regularity, and though we but spent some thirty or forty minutes in watching these little pictures dissolve into one grand whole, sufficiently long was it to impress upon

us scenes not easily forgotten.

Pointing to the foregoing, I slapped Coombes on the shoulder and said, "Do you think you could paint us a picture like that, old friend? Not at all bad on the screen." He quietly replied, "If my powers permitted my producing a picture such as that in front of me, history would have something to say of a second Turner, or a second Rubens, and you, my boy, would frequently read of Sir George Coombs, R.A." We strolled on until the bridge that spans the railway in front of the Crystal Palace was reached. The clearness of the morning enabled us to make some excellent pictures. Looking from the point mentioned, the sombre architecture of St. Paul's was particularly prominent. Many were the notes made and lengthy the conversation indulged in whilst we sat at breakfast in our Camberwell lodgings, after the most enjoyable twelve mile spin the writer can remember.

October 26th, 1875, G. C., R. S., Bob and myself went into the clock, and belfry above, at St. Stephen's, better known as "Big Ben." Yes, kind reader, a positive fact, I assure you. "Ah!" you say, with a suspicious doubt lurking in your mind, "first time I ever heard of anyone being allowed up there." That is readily granted, for *it was not allowed*.

Many of the incidents recorded in these diary jottings are not of the ordinary stereotyped class; they are, nevertheless, facts, and the entry October 26th, 1875, relating to seeing London by moonlight from the tower mentioned, happened in the following way:—

During the summer we ascertained, after much inquiry, that visitors were not allowed inside the Westminster clock. This veto naturally developed into curiosity on our part, for we wanted to prove the exception to the rule. We made a visit to the House of Commons in order to (pardon the phrase) pump the officials, but no success. They each and all said, "Twasn't allowed." Next, while sauntering round and round Palace Yard, we button-holed a good-natured looking policeman, who did not think he could help us to carry our wishes into effect. He had barely finished speaking, when it was presumed he noticed my hand in my trouser's pocket rattling some change. "But, gentlemen," he went on, "I'll tell you what. I'm on night duty here next week, so if you could see me about Tuesday, say 11 o'clock, I might by then know something." Presto pass, and a coin dropped to the bottom of P.-c. Bowering's pocket.

"Tuesday night," I said, "I am here." "Hem! 'Duke's Motto'?" Here was the key-note to the movement.

Tuesday night, P.-c. Bowering informed me,

that his friend the gas man had consented to take up a small party of not more than four, as a special favour to him, at midnight when he went to lower the lights.

So it was fixed for the next night, 11.30. Bowering was to put us right, but we must be punctual to time. "My friend's partial to a drop o' rum," he said. I promised him that would be all right, and bade him "Good night."

Four gay spirits were at the trysting place at the appointed hour, primed with a bottle of real old Jamaca. We passed from one p.-c. to another, until we were introduced to Mr. Gasman, who, with lantern in hand, said, "Gents., follow me. The last in, please slam the door." After ascending twenty or thirty steps of the huge spiral stairway, we were warned by the four quarter bells that Benjamin was about to boom out twelve thunderous strokes, and so register the division between to-day and to-morrow. Said our guide, "Stand still, gentlemen, please, or sit on the stairs till the clock's done striking." One or more of us were thankful for the hint, for the vibration was stunning; far more so, indeed, than was felt a quarter of an hour later, when we were leaning over the belfry rail actually touching the bells as they pealed out the quarter past.

As could be expected, the visit to this giant clock was deeply interesting. From the parapit without grand views were visible, and the fine moonlight greatly helping to illuminate east, west, north and south of the mighty metropolis. The Crystal Palace looked no bigger than an ordinary conservatory, and the bridges that span Old Father Thames appeared as strips of ribbon, the great height so condensed the surroundings. It was three o'clock when we crept into bed, tired but satisfied.

—:o:—

To find the Quantity of Gas in a Cylinder.

MULTIPLY the pressure by the size, and divide by the pressure at which it contains any given quantity, when the quotient will be the answer. EXAMPLE:—A vessel contains 20 cubic feet at 120 atmospheres, the pressure is, say 45, multiplied by 20, equals 900, which, divided by 120, equals $7\frac{1}{2}$. ($45 \times 20 = 900 \div 120 = 7\frac{1}{2}$ cubic feet).

—:o:—

Editorial Table.

SLIDE MAKING AND COLOURING.—Some fine examples of lantern slides, plain and coloured, have been sent to us by Mr. A. H. Saunders, Mount Pleasant, Brierley Hill. They are carefully and well executed.

"HANDBOOK ON THE USE OF COMPOUND OXYGEN."—Mr. Kenneth S. Murray, M.I. Mech.E., who is well-known in connection with the Brins Oxygen Co., and in other scientific pursuits, has just completed a valuable treatise on the above subject. The book is published by Messrs. Ede, Dearberg & Co., 40, Queen Street, Cheapside, E.C., and contains very full particulars of the various methods for producing oxygen commercially, mode of compressing gas, construction of cylinders, particulars of valves and fittings, and various applications of oxygen. Lanternists and users of compressed gasses will find this book of 82 pages to contain matter that is of a highly instructive nature, written in language easy of comprehension. Price 1s. 6d.

THIOCARBAMID (Hauff's).—For removing stain and for cleaning negatives and transparencies, this new salt has been introduced by Messrs. Fuerst Bros., 17, Philpot Lane, and can be obtained from most dealers. The following formulæ, &c., have been recommended by Dr. J. M. Eder:—Thiocarbamid possesses the property (when added to the fixing bath) of preventing bromide silver gelatine plates, as well as chloride silver gelatine plates; and bromide silver gelatine papers from colouring the gelatine layer yellow, and prevents the formation of a so-called green fog. It acts (in acid solution) as a preventative against yellowish negatives. I made a solution of

10 parts.....Thiocarbamid,
10 parts.....Citric acid or sulphuric acid,
1,000 parts.....Water.

If the salt is added to the fixing bath it prevents the formation of green fogs with plates and bromide silver papers; but it must be observed that the bath should be acid. For fixing, the following formulæ is useful:—

Water.....1,000 cubic c/m,
Fixing Soda.....200 grammes,
Thiocarbamid.....10-15 grammes,

to this solution is added 50 grammes of bi-sulphate of soda. Plates, as well as papers, before fixing, must be washed sufficiently so as to remove the traces of the developer. As the action of the Thiocarbamid in the fixing bath is only of proportionately short duration, it is recommended to use an ordinary acid fixing bath, which, as is known, will by itself prevent, to a certain extent, the formation of green fog; and after the use of this, if necessary, the above discolouring bath can be applied, and which will become necessary specially for certain kinds of bromide silver gelatine paper.

—:o:—

Correspondence.

A CORRECTION.

To the Editor.

SIR,—Will you kindly pardon me for correcting the information you give in Notes and Queries in December's JOURNAL to "Geo. Daltry." The business of the Dalton Manufacturing Company is now wholly carried on at 12, Norfolk-street, Ardwick, Manchester, the office at 12, Peter-street, being discontinued for some time. I may add that the Company are now producing a better lacquer than ever, recent samples being much superior in every respect to those which I had used previous to introducing the matter in the pages of your JOURNAL in June, 1892.

I would also like to give my testimony in favour of Lawson's Saturator. I procured one in March last, and my experience of its use has been highly satisfactory, and I have no hesitation in stating that I consider the light produced by it quite equal in its intensity to that given by the mixed gases in the mixed jet. I have only used

the charge made for such test; it is quite at the option the Saturator in the single lantern, and can say nothing with reference to its use in the Bi-unial Lantern.

I am, yours, etc.,

JOHN J. BOYDE.

"The Mooragh," Ramsey, I. of M,

RE GRIDIRON SATURATOR.

To the Editor.

SIR,—Readers will have noticed in last issue a letter from Messrs. Morgan and Morgan on behalf of Messrs. Riley Bros., with reference to certain alleged infringements of the Lawson Saturator. As I have also had a letter from them I should have been pleased to have discussed the matter privately with them, but as they inserted a letter in your columns it is now only right that my reply should be made in the same manner. I am authorised to state that the Gridiron Saturator is being constructed upon an entirely new principle, arrived at from long practical experiments, and this Saturator, I may state, has stood all kinds of tests at the hands of some of the best scientific men, who have all been surprised at its performances. One scientist before expressing his opinion had it alight continuously for two days.

Below are the claims which appear in Lawson's Specification, No. 20,628, 1892.

Lawson claims—	Gridiron Saturator—
1. For metallic tube and valve carrier with 2nd gas passage.	Has not such an arrangement.
2. Lime bracket adjusted by rack and pinion.	" " " "
3. Shield for lime.	" " " "
4. Clockwork to move lime	" " " "
5. Single cock valve.	" " " "
6. Pipe for additional jets	" " " "

So that these arrangements are not used on the Gridiron Saturator, which is constructed on a more perfect system.

Yours truly,

F. BROWN,

Limelight Jet Manufacturer.

13, Ossulston-street, London, N.W.

THE PRICE OF HYDROGEN WHEN COMPRESSED.

To the Editor.

SIR,—I was glad to see "Bombaste's Triple" in your last issue ask a question that I wonder has not been asked before, viz., "Why should we have to pay such an enormous price for compressed coal gas?" Taking as an average price 3s. per 1,000 cubic feet for gas from the main (it most likely costs about 2s. per 1,000 in large towns), 40 feet of gas costs a fraction over 2d.; the exact figures are 2-01d. Now, if we want this compressed we have to pay, providing it is in our own bottle, 2½d. per foot, or 8s. 4d. for 40 ft. If, however, we have to use the Company's cylinder, we are charged 3d. per foot, or 10s. for 40 ft. If a smaller quantity is required, say 10 ft., we have to pay at an increased rate. 10 ft. of gas at 3s. per 1,000 costs the compressors about ½d., but for compressing it in our own bottle they charge 2s. 6d., and in bottles belonging to them, 3s. 4d.

Now, when the cost of carriage is added to these figures, it means that 40 ft. of gas in our own cylinder is going to cost about 10s., which to those who, like myself, have a slender purse, means—well, we must go without, it and use the blow-through jets, or a saturator if a single lantern is used. We cannot complain of the price of oxygen, but I do not think we ought to pay such an exorbitant price

for coal gas. I should like to see a few other lanternists' views on the matter.

Wishing you a prosperous New Year,†

I remain, yours truly,

FRED.

Dover, Dec. 19, 1893.

AN EASY WAY TO MAKE SLIDES.

To the Editor.

SIR,—There is an exceedingly easy way of making lantern slides, especially for children, which I have never yet seen published. It is as follows:—Take any print which is printed on one side of the paper only, as in Tenniel's cartoons in *Punch*, place a piece of plain glass in a printing frame, and on that the print and a piece of albuminized paper face to face; print in a good light till every line of the print shows white on the paper.

You have now a capital negative, from which can be printed an excellent lantern slide by using any of the brands of lantern plates.

I enclose a slide made in this way from one of *Punch's* pictures; also the negative.

If an enterprising publisher would take the matter up, and issue a series of pictures, 3¼ in. square, printed on one side of a suitable paper, I think he would find it pay, and a pleasant amusement would be provided for those who are not possessors of a camera.

I am, yours obediently,

A. F. WILKINS.

Trowbridge, Wilts.

[The slide sent is very clear.—Ed.]

CORRUGATED GAS CYLINDERS.

To the Editor.

SIR,—The recent explosion of a cylinder at Bradford, a which a youth lost his life—and which would doubtless have caused injury to many others had the accident happened in a busy thoroughfare—has brought about great distrust and doubt as to the safety of the cylinders for public exhibition. This fact must be apparent to all whose business lay in this direction, happening, unfortunately, just at the commencement of the season.

Already, in many cases, oil lamps have been used by timid exhibitors. In others, customers have insisted when giving an order for limelight demonstration that cylinders must not be used, thus necessitating argumentative proof of their reliability; this really being the only way out of the difficulty, gas bags having received a final death blow on account of the Ilkestone accident last year, the result of this being a almost universal adoption of the cylinders.

When public confidence is once lost, especially as regards entertainments, it is difficult to recover. Of course, in the case at Bradford the usual tests were made of other cylinders, and every means brought to bear at the inquest to satisfy the coroner's jury and the public of the general safety of compressed gas cylinders. A cylinder filled to its utmost capacity was allowed to drop a distance of 22 feet upon an iron plate, the result being a very slight indentation. This severe test should prove the general safety, beyond a doubt, providing that the one under test was not specially selected. It would be interesting to know how long the cylinder had been in use, and, particularly, whether it was considered safe for use afterwards? It must, however, be accepted that cylinders under proper conditions are quite safe, and a welcome boon in lieu of the ponderous and ungainly paraphernalia of the gas bag period. But what are the proper conditions? We know that they are tested by the gas companies periodically; that is, if the owner will pay

of the owner. If he does not order the tests to be made the cylinders are used until—like the camel—the last straw proves its limit of strength. Granted the cylinders are tested every three months, what a large amount of wear and tear they have to undergo in the lantern season. Those who have dealings with the cylinders see the same numbers repeatedly turn up, the markings often indistinct with rust, and the screw threads so much worn that it is difficult to find a valve that will get sufficiently tight; and they are frequently sent out to customers, whose misfortune is to find that his one valve will not fit. Hence, many disappointments occur to exhibitor and audience.

Then again, while in transit on rail they are pitched about like so many bars of iron, usually laid in the bottom of a goods wagon to roll against each other the whole length of a long journey, and when delivered frequently placed outside a warehouse in all kinds of weather. These and many others are the unfavourable conditions to which they are subjected, which must tend materially towards deterioration by rust and unnecessary wear and tear.

All cylinders should be marked with the maker's name and date; the number clearly shown and the date of test stamped thereon. A universal thread should be used for valves and cylinders alike, and the keys and stud made to the same size. A plate or letters should also be affixed, marked "With Care." If these measures were carried out it would tend to restore public confidence, and prove a general safeguard.

While the present make of cylinders are all sufficient for their purpose it is quite impossible to improve upon them. It must be admitted that a cast or drawn cylinder of any description cannot be guaranteed of *exactly* equal thickness in all its parts; therefore, a blow or extra wear in any particular part would prove its weakness, with probably disastrous results, although it may be quite able to resist a test of double the amount of internal pressure.

The necessity for interior examination is obvious, which is quite impossible with the present form of cylinder. Even the finished exterior of a cylinder under microscopical examination shows rather alarmingly to an unpractical mind, but I venture to assert that the microscope would not be required to see slight faults in the interior. Of course, minute air-bubbles can scarcely be avoided, but it is the "rift within the lute" which is most likely to bring about disaster.

As I have remarked above, under proper conditions the present form of cylinders are all that can be desired, but that the conditions are generally unfavourable cannot be denied. A *corrugated* drawn steel cylinder, fitted with a cap also *corrugated*, each part made to screw together, the brass nozzle also screwed to the cap—the means of removing the screwed parts to be in the hands of the gas companies and owners of cylinders only.

The means of examination would be all sufficient, the test of resistance to pressure *proved* by the present means, and any liability of the solder being melted around the brass connection—which occurred on one occasion last year—would be obviated. It must be accepted as a fact that iron or steel in a corrugated form is of much greater resistance than the plain circular form, of equal thickness, of metal. Hence, compressed gas cylinders would be of longer endurance; much more safe and reliable made in this form. The screwed attachment would be more reliable, and render a thorough examination of cylinders possible to both manufacturer and purchaser.

Yours truly,
EDGAR HEYWOOD.

15, Winchester-road, Armley.

SATURATORS.

To the Editor.

SIR,—I notice in the December issue of your journal a letter from Messrs. Morgan & Morgan threatening all persons making, vending, or using "certain saturators" (whatever that may mean?) with legal proceedings for infringement of Lawson's Patent Saturator.

As I am a firm believer in the future of ether saturators, I think such a letter is calculated to do a considerable amount of harm, by deterring people from using or buying saturators for fear of legal proceedings.

No doubt it would be exceedingly satisfactory to Messrs. Riley Bros. or any other firm, from a commercial point of view, if they could obtain a monopoly of the saturator business.

In addition to Lawson's, there appear to be two other patent saturators—Scott's and Brown's "Gridiron"—in addition to one by Suiter, but as Scott's patent is prior to Lawson's, I take it that Messrs. Riley Bros. threats are levelled at the others. Now anyone who will take the trouble to examine and compare, say the "Gridiron" saturator, with the claims in Lawson's patent, will, I think, be of opinion that, in this connection, these threats of legal proceedings appear to be more of the nature of business expedients or bluff, and an endeavour to suppress a competing article.

Is it possible that a rival trader is copying Lawson's saturator. If so, why don't Messrs. Riley Bros. say so, and so let an anxious public know which saturators they may be allowed to use, instead of using such ambiguous language as that referred to?

I don't know whether Messrs. Riley Bros. know that by inserting such a letter as that of Messrs. Morgan & Morgan, they render themselves liable to an action for damages; possibly they may have already had this fact impressed upon them.

The ideal saturator has yet to be made; neither the Lawson, "Gridiron," Scott, or Suiter answers all requirements, and such letters as that of Messrs. Morgan & Morgan are calculated to delay the appearance of a perfect saturator.

Yours truly,
ANTI-BOUNCE.

Highbury, N.

CYLINDER PROTECTORS.

To the Editor.

SIR,—It is always as well to prevent any sudden concussion with gas cylinders, so I will inform the readers of a simple method which I adopt, so that should a cylinder fall over it falls easily. It is simple, inexpensive, and quickly fitted to any cylinder. I got two pieces of rope spliced so as to form two rings; these rings were made rather smaller than my cylinder. They were then forced on one near the top, and the other near the bottom of the cylinder, so that when the cylinder is lying on its side it rests on two cushions of rope.

Yours truly,
H. P. CHANDLER.

6F, Peabody Buildings, Farringdon Road, E.C.

ADVERTISEMENT SLIDES.

To the Editor.

SIR,—Referring to the letter of Mr. Geo. Hodson upon this matter in your issue of 1st inst., I think he must allow those who grant what I take to be a mutual privilege—the liberty of imposing such conditions as may seem good to them. At the same time, it is obvious that those who desire efficient advertisement by such means will best consult their own interests by liberal treatment, and absence of "vexatious" restrictions. Messrs. Pears, whose advertisements can hardly be surpassed, whether for originality, variety, or artistic

merit, have always been most generous and courteous in this way. In my own case they have, at different times, supplied me with a really valuable collection of their pictorial advertisements, some of them (as in the case of the celebrated "Bubbles") of a costly nature, requiring two lanterns for exhibition, and these slides are never shown without evoking applause from young and old alike. Moreover, such slides as the "Strobic circles" have a scientific value, and can be used with the best effect to illustrate optical lectures. No conditions whatever are imposed, and those who wish to add variety to their holiday exhibitions need hardly go beyond this eminent firm for as good a collection as they are likely to require.

We lanternists and lecturers have no interest in advertising any particular class of goods, but it is natural that where we are so kindly provided with "taking" pictures, we should feel interest in placing them before our audiences at all suitable times. Your correspondent's letter is valuable as indicating, at least, whom not to approach on such a subject. Good slides of this description have permanent interest, and when always in stock will, of course, be often used.

Faithfully yours,

WILLIAM R. MAY,

Of the late Royal Polytechnic Institution.
130, St. Paul's Road, Canonbury,
16th December, 1893.

—:O:—

Notes and Queries.

John Stewart.—We have observed the wavyness about which you speak, and have sent you a sample which we had by us.

J. G. Thompson.—The date of the *Christian Herald* was either the second or third week in October.

A.B.—(1) In our issue for December, 1892, you will find an article on the subject of old coal gas. (2) Iron and carbonmonoxide slowly unite together, forming the volatile compound iron carbonyl, and when the contaminated gas is burned oxide of iron is formed as a deposit on the limes. If the cylinder is made red hot the incrustation can be got rid of. The effect will be the same with mixed jet. (3) Blow through about 5, mixed say 3, and for the other about 3 ft. of either kind. There is little or no difference between light from pure hydrogen and coal gas.

A. M. Hiddon.—The book you mention was sent to us.

H. Hunter.—The relative intensity will be about as follows:—Oil, 50 to 90 c.p.; blow through, 100 to 200 c.p.; mixed jets and saturators, 250 to 600 c.p. We have sent you prices of back numbers.

F. J. B. asks which condenser, rectangular or circular, collects the greatest amount of light for enlarging purposes from the same illuminant. *Ans.*—Both the same. If you place a negative close to a circular condenser you will find that although the corners of the plate may come close to the edge of condenser that there will be certain portions of the condenser, at the top, bottom, and sides, that are not being used; if you cut those portions away you have a rectangular condenser.

A. H. Dunning writes: "I want to cut some lantern masks of a peculiar shape, but as I only want a few of them, it is not worth while to have them specially cut by professional? Where can I get the black paper in small quantities?" *Reply.*—Ask a wholesale stationer for paper known as black needle paper; it is very moderate in price.

J. G. Sanderson (Quebec).—We made the inquiries about the missing parcel; the matter was an oversight. The firm you speak of has an exceedingly high reputation, and have been in business a great many years, and

you may rely upon it that whatever instructions you entrust them with will be faithfully carried out to the very letter, but mistakes will occur even in the best regulated families, and in this case the order got mislaid before it was entered.

Art.—You can get cloud negatives from from Messrs. Butcher and Son, of Blackheath. We understand that that they have many different styles.

W. T. writes: "When in London I called at the address you gave in July last journal, to purchase a Uno camera, but could not even find the name. Can you give me the correct address?" *Ans.*—The address we gave was the correct one at the time, but since then they have gone, we know not whither. We have reason to believe, that the Co. is not now in existence.

Lanternist says: "My chief trouble is in turning the lime, and this I frequently forget. Is it not possible to make a lime that will not pit, and consequently will not required to be turned—one that when placed in position will last the evening out without any attention?" *Ans.*—On another page you will find an advertisement of a lime that is said to require turning only once an hour, try it, and see if it answers your purpose.

H.—We pay for all accepted articles. Send it on to us, and if we decide to publish it, we will send you a cheque by the same post as you get the voucher copy. This has been our practice for a long time past.

A. E. S.—We presume the bottle was provided with both gauge and regulator. Perhaps the regulator was one of old make; in one kind we know of, the makers make the part that broke of stouter metal than they did at first. You need not have used the blow through jet instead of the mixed. The one cylinder would have regulator, and with a little trouble the other could have been regulated from the bottle, with the key.

Jos. Dickinson writes: "Some time ago you suggested making a lantern-slide for testing a lens by mounting a piece of Brussels net between two cover glasses. I have tried it, but always managed to pull the openings of the net out of shape, so that, although they answer the purpose, they do not look well when magnified on the screen. Can you tell me of any other means of making a test slide?" *Ans.*—It is not necessary to stretch the net. Iron a piece, lay it on glass, place another over it, and cut off the surplus, then bind the slide. Another method of making a slide is to place a gelatine photographic plate in a solution of hyposulphite of soda, wash well, and allow to dry; then rule lines with Indian ink across the plate.

Puzzled asks if it is possible to project a lantern picture in the air, and, if so, how? I recently read that by means of an aerial graphoscope a lantern screen could be dispensed with. Can you oblige with any information upon the subject. *Reply.*—This cannot be done without a screen of some sort. To make what is termed an aerial graphoscope, suspend and pivot a board by its centre, and rotate it quickly, after the style of the arms of a windmill, and upon this project a picture.

C. G. Wallace.—The light about which you ask is not nearly strong enough, better use your mixed jet. If you use a Saturator you will only require oxygen.

To R. Moss and others.—Several items of interest have been held over for want of space.

Herold.—By the time you read this we will have binding cases, reading cases and bound volumes ready. You will find particulars on the first page of this issue.

F. Weeks.—We understand that the "primuline" materials can be obtained from Messrs. Watson & Sons, 313, High Holborn.

We thank a large number of correspondents for letters containing expressions of good wishes for the New Year.